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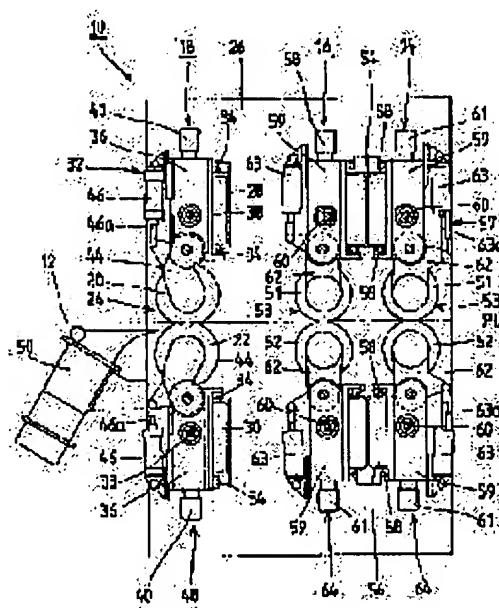
## (54) RUNNING METHOD OF SLITTER

(57)Abstract:

PURPOSE: To shorten the total length of a corrugator line and surely separate and remove trimmed pieces by a method wherein cutting means as is held at cutting work positions are moved by the required speed towards cutting positions at the change of the cutting dimensions in corrugated board sheet.

CONSTITUTION: Scorers 14 and 16 are provided to the feeding direction of corrugated board sheet 12. On the downstream side of the sheet, a plurality of sets of vertically movable slitting knives 20 and 22 are provided so as to be relatively movable to the breadth direction of the corrugated board sheet 12. In addition, a plurality of sets of score line rolls 51 and 52 of the scorers 14 and 16 are provided vertically movably to the breadth direction of the sheet so as to make moving members 59 movable breadthwise along screw shafts 60. Further, at the change of the

cutting dimensions, center slitting knives 20 and 22 are retreated with cylinders 46 and 46 to non-working position, while, under the state being held at working position, other slitting knives 20 and 22 are moved along screw shafts 38 by servo-motors 40 at the speed proportional to the feeding speed of the sheet.



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**CLAIMS**

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[Claim(s)]

[Claim 1] In the slitting machine equipped with two or more cutting means (24) to cut the corrugated paper sheet (12) supplied from a colgater line in the feed direction, free [ migration in the feed direction of a corrugated paper sheet (12), and the crossing direction ] The operating method of the slitting machine characterized by turning to the cutting location of new order a having held in processing location which cuts this sheet's (12)'s when order modification of cutout dimension is produced on said corrugated paper sheet (12) cutting means (24), and making it move it at the rate of necessary.

[Claim 2] A cutting means (24) to trim the garbage of the both-ends edge in the cross direction of said corrugated paper sheet (12) While moving inside from the crosswise outside which does not contact a corrugated paper sheet (12) at the rate of necessary and starting trimming in the condition [ being held in the processing location which cuts a sheet (12) ] The operating method of the slitting machine according to claim 1 which ends trimming by moving outside at the rate of necessary from the condition of

performing trimming.

[Claim 3] The operating method of the slitting machine according to claim 1 or 2 it was made to make it move to this sheet (12) at the rate of necessary towards the scoring location of new order in the condition [ having held in the processing location which gives scoring ] when order modification of a cutout dimension was produced for two or more roll groups (53) which give scoring of the feed direction to the corrugated paper sheet (12) supplied from said colgater line on said corrugated paper sheet (12).

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the operating method of the slitting machine it was made to move a slitting machine knife to the cutting location of new order with a processing condition, when order modification of a cutout dimension is produced about the operating method of a slitting machine in the slitting machine cut in the feed direction with the slitting machine knife of the pair which arranged the corrugated paper sheet which follows a detail further due to up-and-down.

[0002]

[Description of the Prior Art] While the corrugated paper sheet continuously manufactured with a colgater line is cut by the slitting machine along the feed direction near the final process of the Rhine concerned and two or more \*\* picking is made, horizontal ruled line processing (scoring) is performed if needed. This slitting machine has two or more slitting machine knife groups which consist of a slitting machine knife of the pair arranged due to the upper and lower sides which face across feed Rhine of a corrugated paper sheet crosswise [ of a corrugated paper sheet ] (the feed direction and crossing direction). Both the slitting machine knife of each slitting machine knife group is constituted possible [ positioning ] by the non-processed location which made the edge of a blade estrange up and down from feed Rhine, and the processing location with which the edge of a blade was made only for predetermined die length to lap while it rotates mutually in an opposite direction. And the corrugated paper sheet which passes through between both slitting machine knives is cut along the feed direction by positioning both the slitting machine knife in a processing location.

[0003] It is necessary to change the number of \*\* picking from said continuous corrugated paper sheet, and the width method of each sheet by which \*\* picking is carried out (the so-called "order modification"), and this order change is made by carrying out migration adjustment of said each slitting machine knife group crosswise [ sheet ]. That is, where the slitting machine knife which attends a processing location by order modification command is evacuated to a non-processed location, after moving each slitting machine knife group to the cutting location of new order, a corrugated paper sheet can be cut by new order by positioning a slitting machine knife in a processing location. In this case, while moving a slitting machine knife group to the cutting location of new order from the cutting location of the old order, since cutting with a slitting machine knife is in a impossible condition, it is necessary to stop a production line, and there is a

problem to which production efficiency falls. Then, while arranging two sets of slitting machines to a serial in the feed direction and cutting the corrugated paper sheet in one 1st unit, justifying each slitting machine knife group in the 2nd unit in un-working [ of another side ] next time for order is performed. Thereby, while evacuating each slitting machine knife of the 1st unit to a non-processed location on the occasion of order modification, by making a processing location face each slitting machine knife of the 2nd unit, it can respond to order modification promptly and a halt of a production line can be avoided.

[0004]

[Problem(s) to be Solved by the Invention] However, even if it is the case where change two sets of slitting machines and it operates, producing the defective of requirements on the occasion of order modification is not avoided. That is, it was difficult they to have made completely in agreement the cutting trailer produced on a corrugated paper sheet by evacuating the slitting machine knife of the 1st unit to a non-processed location and the cutting leader produced on a corrugated paper sheet by making a processing location face the slitting machine knife of the 2nd unit, since the 1st unit and the 2nd unit are arranged with necessary spacing, the necessary error was produced and the part had become a defective. Moreover, since the air cylinder is used as a means which changes a slitting machine knife to a processing location and a non-processed location, a necessary time delay is produced to change timing, and, thereby, a defective is generated. Furthermore, in cutting with an up-and-down slitting machine knife, since cutting of a corrugated paper sheet was not made, after positioning it in a processing location, it required necessary cutting-edge doubling time amount, and was to produce a defective in the meantime, if cutting-edge doubling of both the knives is not carried out correctly.

[0005] Thus, the present condition is being unable to prevent generating of the defective for order modification completely, even if it is the configuration which arranges two sets of slitting machines. And it was inherent to arrange two slitting machines in the point that facility cost increases, and the problem that the overall length of Rhine becomes long and a deployment of the tooth space in works cannot be aimed at.

[0006] Moreover, when performing two or more dish picking from a continuous corrugated paper sheet, in the both-ends edge in the cross direction of this sheet, a large and small garbage arises according to the finished size of a web material, and this part is cut by the slitting machine knife group located in the maximum outside in a slitting machine at it (trimming). And the garbage (piece of a trim) by which trimming was carried out is attracted by the suction means formed in the downstream, and separation removal is carried out from a corrugated paper sheet. In this case, if the cutout dimension by the slitting machine is conventionally changed by order modification, since said slitting machine knife will evacuate to a non-processed location, said piece of a trim has become [ connecting with a corrugated paper sheet with as, and ]. Therefore, the trim shear equipment for cutting the piece of a trim in the feed direction and the direction which intersects perpendicularly, and dissociating from a corrugated paper sheet was needed, and while the device became complicated, there was a fault in which cost increases.

[0007] Furthermore, the width method of the piece of a trim might become large, and when a production rate was a high speed, the situation of having not attracted the start

edge of the piece of a trim after order modification with said suction means, and stopping Rhine by the suction mistake of this piece of a trim might be caused, and production efficiency might fall. That is, the actual condition is that the operator is supervising the suction mistake of said piece of a trim in a colgater line, and this had become the obstruction of full automation.

[0008]

[Objects of the Invention] In view of a technical problem inherent in the slitting machine mentioned above, this invention is proposed so that it may solve this suitably, reduction of facility cost and improvement in space efficiency can be aimed at, and it aims at offering a means by which positive separation removal of the piece of a trim from a corrugated paper sheet is performed collectively, and full automation of Rhine can be attained.

[0009]

[Means for Solving the Problem] In order to conquer said technical problem and to attain the desired end, the operating method of the slitting machine concerning this invention In the slitting machine equipped with two or more cutting means to cut the corrugated paper sheet supplied from a colgater line in the feed direction, free [ migration in the feed direction of a corrugated paper sheet, and the crossing direction ] When order modification of a cutout dimension is produced on said corrugated paper sheet, it is characterized by turning to the cutting location of new order a having held in processing location which cuts this sheet's cutting means, and making it move it at the rate of necessary.

[0010]

[Example] Next, about the operating method of the slitting machine concerning this invention, a suitable example is given, and it explains below, referring to an accompanying drawing. In addition, in invention concerning claim 1 and claim 2 of this application, although an example mentions and explains the slitter scorer equipment which put the slitting machine and the scorekeeper side by side to the serial, even if it is a slitting machine independent machine, it can carry out.

[0011] The slitter scorer equipment 10 of illustration equips the downstream with one set of a slitting machine 18 while equipping the feed direction upstream of the corrugated paper sheet 12 with two sets of scorekeepers 14 and 16. The slitting machine 18 is equipped with two or more sets (an example 5 sets) of slitting machine knife groups (cutting means) 24 which consist of disc-like slitting machine knives 20 and 22 which make the pair which is up-and-down relation and rotates mutually in an opposite direction on both sides of the pass line PL of the corrugated paper sheet 12 crosswise [ of the corrugated paper sheet 12 ] (refer to drawing 2 ). And this sheet 12 is cut in the feed direction by supplying the corrugated paper sheet 12 among the slitting machine each knives 20 and 22. between the processing location where the slitting machine knives 20 and 22 of each slitting machine knife group 24 cut the corrugated paper sheet 12, and the non-processed locations estranged from this sheet 12 -- rise and fall -- it is constituted movable, and each slitting machine knife group 24 is arranged crosswise mutually free [ migration ], and it is constituted so that positioning adjustment may be carried out according to modification of the number of \*\* picking by order modification, or \*\* picking width of face. Then, lessons is taken from the elevator style of the slitting

machine knives 20 and 22, and the migration device of the slitting machine knife group 24, and it explains.

[0012] That is, among the frames 26 and 26 estranged and arranged in the slitter scorer equipment 10 actuation-side and the driving side, as shown in drawing 2, predetermined spacing alienation is carried out and the beams 28 and 30 of a pair are constructed over the upper and lower sides which sandwich the pass line PL of said corrugated paper sheet 12 in parallel. And the up knife support unit 32 of the same number as the slitting machine knife group 24 is arranged free [ migration ] by the upper beam 28. Each up knife support unit 32 equips the guide rails 34 and 34 of the pair arranged in parallel with a beam 28 with the migration member 36 arranged free [ sliding ], and the \*\*\*\* shaft 38 which carried out construction immobilization is screwed in by the nut (not shown) arranged in this migration member 36 at both the frames 26 and 26. Moreover, the servo motor 40 in which variable speed control is possible is arranged by the migration member 36, and by rotating a nut with this servo motor 40, the migration member 36 is \*\*\*\*ed, and it is constituted so that it may be made to move in accordance with a shaft 38. In addition, drive control is carried out according to an individual by the control device 42 mentioned later, respectively, and the servo motor 40 of each up knife support unit 32 is set up so that the migration member 36 may be moved at the rate proportional to the feed rate (line speed) of the corrugated paper sheet 12.

[0013] As shown in drawing 1, a holder 44 is arranged free [ tilting ] by the lower part of said migration member 36, and is arranged in this holder 44 free [ rotation of the disc-like slitting machine knife 20 ]. And in proportion to the operating speed of a colgater, the rotation drive of this slitting machine knife 20 is carried out. Moreover, a cylinder 46 is arranged by the migration member 36 possible [ tilting ], and piston rod 46a of this cylinder 46 is supported pivotably in the holder 44. That is, by energizing a cylinder 46 to forward hard flow, and carrying out tilt of the holder 44, it is constituted so that said slitting machine knife 20 can be positioned in the processing location which cuts the corrugated paper sheet 12, and the non-processed location estranged from a pass line PL to the upper part.

[0014] As shown in drawing 1, the lower knife support unit 48 of a configuration of becoming symmetrical up and down corresponding to each up knife support unit 32 arranged in the upper beam 28 is arranged by the beam 30 of said bottom. And this sheet 12 is cut in the feed direction by supplying the corrugated paper sheet 12 among the slitting machine knives 20 and 22 positioned in the processing location in the units 32 and 48 of the corresponding upper and lower sides. Moreover, the slitting machine knife 22 of the lower knife support unit 48 is evacuated from a processing location to a downward non-processed location from the pass line PL of the corrugated paper sheet 12. In addition, about each part material of the lower knife support unit 48, the same sign as the same member to which the up knife support unit 32 corresponds is attached.

[0015] By four sets of the knife support units 32, 48, 32, and 48 located in the maximum outside of the cross direction in said slitting machine 18, the device in which you made it go up and down between a processing location and a non-processed location was omitted in the slitting machine knives 20, 22, 20, and 22 of each correspondence, and the slitting machine knives 20 and 22 which make a pair by the upper and lower sides are always positioned in the processing location. That is, since it is what is used in case the garbage

produced at the both-ends edge in the cross direction of the corrugated paper sheet 12 is trimmed, in case it is the order which a garbage does not produce, trimming of two sets of the slitting machine knife groups 24 and 24 located in the maximum outside is not carried out by making it move to the outside which does not contact the corrugated paper sheet 12.

[0016] In under surface than the pass line PL of the corrugated paper sheet 12, the trim ducts 50 and 50 (only one side is illustrated) connected in the source of suction which is not illustrated are arranged in the slitting machine knife groups 24 and 24 of the maximum outside, and a corresponding location by the downstream of said slitting machine 18. And the pieces 12a and 12a of a trim which it is cut by the slitting machine knife groups 24 and 24 of this \*\*, and are produced from the corrugated paper sheet 12 by these trim ducts 50 and 50 are attracted, and separation removal is carried out from this sheet 12. In addition, long picture piece of trim 12a attracted by the trim duct 50 is discarded after being cut by the short length piece with the cutter equipment which is not illustrated. As shown in drawing 3, said trim duct 50 is arranged by the holder 44 of the slitting machine knife 22 of the bottom in the slitting machine knife group 24 of the maximum outside, and it is constituted so that it may move in one with this knife 22. That is, when the number of \*\* picking and the other \*\* picking width of face of the corrugated paper sheet 12 are changed, the trim duct 50 moves in one with the slitting machine knife 22, and it is constituted so that piece of trim 12a may be attracted certainly. In addition, in drawing 3, a sign 49 shows the guide plate which supports the edge section of the corrugated paper sheet 12, and this guide plate 49 moves it in one with the slitting machine knife 22.

[0017] Two sets of the basic configuration of the scorekeepers 14 and 16 stationed at the upstream of said slitting machine 18 are the same as that of a slitting machine 18, and it differs in that replace with the slitting machine knives 20 and 22, and the ruled line rolls 51 and 52 are arranged. In addition, since the configuration of two sets of scorekeepers 14 and 16 is the same, it shall explain per configuration of the scorekeeper 14 located in the feed direction upstream, and the same sign shall be given to the same member of the scorekeeper 16 of the downstream.

[0018] On both sides of the pass line PL of the corrugated paper sheet 12, said scorekeeper 14 is up-and-down relation, and has two or more sets (an example 4 sets) of roll groups 53 which consist of ruled line rolls 51 and 52 which make the pair which rotates mutually in an opposite direction crosswise [ of the corrugated paper sheet 12 ]. And scoring is given to this sheet 12 in the feed direction by supplying the corrugated paper sheet 12 among the ruled line rolls 51 and 52 which make a pair. between the processing location where the ruled line rolls 51 and 52 of each roll group 53 give scoring to the corrugated-paper sheet 12, and the non-processed locations which do not give scoring to this sheet -- rise and fall -- it is constituted movable, and each roll group 53 is arranged crosswise mutually free [ migration ], and it is constituted so that positioning adjustment may be carried out according to modification of the number of \*\* picking by order modification, or \*\* picking width of face. Then, lessons is taken from the elevator style of the ruled line rolls 51 and 52, and the migration device of the roll group 53, and it explains.

[0019] That is, among said frames 26 and 26, predetermined spacing alienation is carried

out and the beams 54 and 56 of a pair are constructed over the upper and lower sides which sandwich the pass line PL of said corrugated paper sheet 12 in parallel. And the up roll support unit 57 of the same number as the roll group 53 is arranged free [ migration ] by the upper beam 54. Each up roll support unit 57 equips the guide rails 58 and 58 of the pair arranged in parallel with a beam 54 with the migration member 59 arranged free [ sliding ], and the \*\*\*\* shaft 60 which carried out construction immobilization is screwed in by the nut (not shown) arranged in this migration member 59 at both the frames 26 and 26. Moreover, the servo motor 61 in which variable speed control is possible is arranged by the migration member 59, and by rotating a nut with this servo motor 61, the migration member 59 is \*\*\*\*ed, and it is constituted so that it may be made to move in accordance with a shaft 60. In addition, drive control of the servo motor 61 of each up roll support unit 57 is carried out according to an individual by said control unit 42, respectively.

[0020] A holder 62 is arranged free [ tilting ] by the lower part of said migration member 59, and is arranged in this holder 62 free [ rotation of the disc-like ruled line roll 51 ]. And in proportion to the operating speed of a colgater, the rotation drive of this ruled line roll 51 is carried out. Moreover, a cylinder 63 is arranged by the migration member 59 possible [ tilting ], and piston rod 63a of this cylinder 63 is supported pivotably in the holder 62. That is, by energizing a cylinder 63 to forward hard flow, and carrying out tilt of the holder 62, it is constituted so that said ruled line roll 51 can be positioned in the processing location which gives scoring to the corrugated paper sheet 12, and the non-processed location estranged from a pass line PL to the upper part.

[0021] The lower roll support unit 64 of a configuration of becoming symmetrical up and down corresponding to each up roll support unit 57 arranged in the upper beam 54 is arranged by the beam 56 of said bottom. And scoring is given to this sheet 12 by supplying the corrugated paper sheet 12 among the ruled line rolls 51 and 52 positioned in the processing location in the units 57 and 64 of the corresponding upper and lower sides. Moreover, the ruled line roll 52 of the lower roll support unit 64 is set as the corrugated paper sheet 12 from the processing location which gives scoring more possible [ evacuation in a downward non-processed location ] than a pass line PL. In addition, about each part material of the lower roll support unit 64, the same sign as the same member to which the up roll support unit 57 corresponds is attached.

[0022] Drawing 5 shows the control circuit 65 of slitter scorer equipment 10, this circuit 65 builds in a control unit 42, and each servo motor 40 of each of said knife support units 32 and 48 is connected to this control unit 42 through the servo drive unit 66, respectively. Moreover, the location detection means 69 arranged in each servo motor 40 is connected to the servo drive unit 66 of correspondence. Furthermore, the high order production-control equipment 68 which manages the general-purpose actuation units 67, such as \*\* keyboard arranged in the control panel (not shown) of slitter scorer equipment 10 and a touch panel, and the whole colgater line is connected to the control unit 42. Furthermore, it has connected also with the rotation pulse generator 70 which actually detects the double facer or sheet rate which is not illustrated. And while data, such as a cutting location of each slitting machine knife group 24 corresponding to each order and a scoring location of each roll group 53, are beforehand inputted by the general-purpose actuation unit 67, the same command is taken out also from high order production-control



equipment 68, and the feed rate of the corrugated paper sheet 12 is also given. In addition, although not illustrated, the servo motor 61 to which each roller support units 57 and 64 of SUKORAA 14 and 16 are moved is also connected to the control unit 42 through the servo drive unit.

[0023] That is, when order modification is produced in the cutout dimension of the corrugated paper sheet 12, operation data processing of the order substitute stage, rate command, and location command which were set up based on the feed rate of the corrugated paper sheet 12 inputted from said high order production-control equipment 68 is carried out via a control device 42, and they are outputted to each servo drive unit 66. Thereby, drive control of each servo motor 40 is carried out, and each slitting machine knife group 24 is moved to the cutting location of new order at the rate proportional to the feed rate of the corrugated paper sheet 12. In addition, the passing speed of the slitting machine knife group 24 can stop the yield of the defective produced in the case of order modification few, for example, is set as  $1/6 - 1/10$  of a sheet feed rate while it can move, where good cutting of the corrugated paper sheet 12 with the slitting machine knives 20 and 22 is maintained. Moreover, if it is this rate, the load which joins a migration device can also be pressed down to tolerance.

[0024]

[Function of Example(s)] Next, it explains per operation of the slitter scorer equipment concerning an example. In addition, in the order of the present (old things), as shown in drawing 6 (a), all the slitting machine knife groups 24 in a slitting machine 18 shall be used, and four-dish picking of the corrugated paper sheet 12 shall be performed. Moreover, all shall be used and necessary scoring shall be given to the corrugated paper sheet 12 also for scorekeepers' 14 and 16 roll group 53.

[0025] If the command which picks three dishes in the corrugated paper sheet 12 by order modification is emitted in this condition, the slitting machine knives 20 and 22 in the central slitting machine knife group 24 will be evacuated from a processing location to a non-processed location by energization of cylinders 46 and 46. Moreover, the other slitting machine knife groups 24 are in a condition [ having held the slitting machine knives 20 and 22 in the processing location ], and are moved at the rate which is proportional to a sheet feed rate to the cutting location of new \*\* order by carrying out drive control of the servo motor 40 of correspondence by the control unit 42. That is, the corrugated paper sheet 12 with which it is fed will be aslant cut, as a two-dot chain line shows drawing 6 (b). And if each slitting machine knife group 24 arrives at the cutting location of new order, respectively, a servo motor 40 will be suspended and positioning of the knife group 24 will be completed (refer to drawing 6 (c)).

[0026] Moreover, also in said scorekeepers 14 and 16, while evacuating the ruled line rolls 51 and 52 of the roll group 53 which become unnecessary to a non-processed location, it is in a condition [ having held the ruled line rolls 51 and 52 in the processing location in the other roll groups 53 ], and is moved to the scoring location of new order at the rate proportional to a sheet feed rate.

[0027] Therefore, while the future corrugated paper sheets 12 pick three dishes by 3 sets of slitting machine knife groups 24, scoring by the roll group 53 is given to the necessary location of this sheet 12. In addition, the amount of the defective produced at the time of the change to new order from the old order can be made into the amount which hardly

changes to the case where two sets of slitting machines have been arranged to the serial by having set up so that the slitting machine knife group 24 might be moved at the rate proportional to a sheet feed rate. Moreover, cutting of the corrugated paper sheet 12 which the slitting machine knife group 24 is moving is also good, and the load to a migration device is also pressed down in tolerance.

[0028] In addition, in new order, justification for the order to which the slitting machine knife group 24 and the roll group 53 in un-working [ which becomes unnecessary ] are needed for a degree is performed beforehand. In this case, even if the justification rate of each class 24 and 53 which can be set is a rate proportional to a sheet feed rate, it may be a fixed rate set up beforehand. moreover, the slitting machine knife group 24 and the roll group 53 to which each slitting machine knife group 24 and the roll group 53 are located in the both sides on the occasion of order modification with the slitter scorer equipment 10 of an example on the basis of the center of the cross direction of the corrugated paper sheet 12 -- relative -- contiguity and alienation -- it is controlled to move. Therefore, on the occasion of migration in the processing condition of each class 24 and 53, the load which joins the corrugated paper sheet 12 acts so that it may negate each other mutually on the basis of a center, and it has the advantage which can prevent generating of meandering of this sheet 12. Thereby, the required meandering arrester can be omitted conventionally and it becomes possible to attain simplification of a device.

[0029] With said slitter scorer equipment 10, the order which does not produce a garbage is in the crosswise both ends of the corrugated paper sheet 12, the slitting machine knife groups 24 and 24 of the maximum outside in a slitting machine 18 are moved outside the edge of the corrugated paper sheet 12 at this time, and trimming of the pieces 12a and 12a of a trim is performed. When the need of trimming the pieces 12a and 12a of a trim of necessary width of face by order modification is produced from such a condition, as shown in drawing 7 , the slitting machine knife groups 24 and 24 of the maximum outside are moved inside from the outside of the corrugated paper sheet 12, holding the slitting machine knives 20 and 22 in a processing location. In addition, the passing speed at this time is set as the rate which is proportional to a sheet feed rate as mentioned above.

[0030] After the edge section of the corrugated paper sheet 12 was cut aslant and these knife groups 24 and 24 arrived at the cutting location of the order concerned, trimming of the piece of trim 12a of a necessary width method is carried out by migration of said slitting machine knife groups 24 and 24. And as shown in drawing 3 R> 3 and drawing 4 , suction removal of each piece of trim 12a by which trimming was carried out is carried out from the corrugated paper sheet 12 with the trim duct 50 of the correspondence located in the lower stream of a river of a slitting machine 18. In addition, since the cutting leader of piece of trim 12a is aslant cut so that it may become necessary width of face from a thin condition gradually, this leader is certainly attracted by the trim duct 50, and does not produce a suction mistake. That is, it becomes the monitor of the suction mistake by the operator is unnecessary, and possible to attain full automation of Rhine.

[0031] And the pieces 12a and 12a of a trim to which the slitting machine knife groups 24 and 24 of the maximum outside move, and trimming is carried out for every necessary order modification will be in the condition that all were connected as shown in drawing 7 , and each piece of trim 12a will be continuously attracted by the suction duct 50. And when changed into the order which does not need cutting of piece of trim 12a again, in

order that the slitting machine knife groups 24 and 24 of the maximum outside may move outside from the inside of the corrugated paper sheet 12, the pieces 12a and 12a of a trim are completely separated from the corrugated paper sheet 12. Therefore, the trim shear equipment which was the need conventionally can be made unnecessary.

[0032] In addition, although the example explained per [ equipped with the device in which a processing location and a non-processed location are made to go up and down the slitting machine knives 20 and 22 and the ruled line rolls 51 and 52 ] thing, these elevator styles are not the indispensable requirements for this application, and can omit this device. Moreover, although considered as the configuration which cuts the corrugated paper sheet 12 with the up-and-down slitting machine knives 20 and 22 in the slitting machine 18, while arranging a slitting machine knife in the bottom, for example on both sides of the corrugated paper sheet 12, the configuration of the one-sheet cutting edge which arranges a cradle in the bottom is also employable. Furthermore, as for the passing speed of said slitting machine knife group 24 and roll group 53, it is possible to also make it move at a sheet feed rate and a not proportional rate according to a class or meteorological conditions of the quality of paper of the sheet which it is not limited to the rate proportional to the sheet feed rate mentioned above, and is processed, and a flute (height of humidity etc.) etc. For example, passing speed is beforehand set up for every monograph affair, and the slitting machine knife group 24 and the roll group 53 are moved at the rate beforehand set up regardless of the height of a sheet feed rate on the occasion of order modification. Moreover, when you do not need process tolerance, it sets passing speed as a high speed, and when you need process tolerance, you may set passing speed as a low speed.

[0033]

[Effect of the Invention] As explained above, even if it is one set of a slitting machine, according to the operating method of the slitting machine concerning this invention, it can respond to order modification according to generating of a defective comparable as the case where two sets of slitting machines have been arranged. That is, while being able to short-\*\*\*\* the overall length of a colgater line and being able to reduce facility cost, a deployment of the tooth space in works can be aimed at. Moreover, since separation removal of the piece of a trim produced from a corrugated paper sheet can be certainly carried out from a sheet, the monitor by the operator is not needed but it becomes possible to attain full automation of Rhine. Furthermore, since the roll group which gives scoring also makes it move to a corrugated paper sheet with a processing condition, it can respond to order modification, without preparing two sets of scorekeepers, and facility cost can be reduced for the overall length of Rhine with short hiding \*\*\*\*.

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## TECHNICAL FIELD

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[Industrial Application] This invention relates to the operating method of the slitting machine it was made to move a slitting machine knife to the cutting location of new order with a processing condition, when order modification of a cutout dimension is produced about the operating method of a slitting machine in the slitting machine cut in the feed direction with the slitting machine knife of the pair which arranged the corrugated paper sheet which follows a detail further due to up-and-down.

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## PRIOR ART

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[Description of the Prior Art] While the corrugated paper sheet continuously manufactured with a colgater line is cut by the slitting machine along the feed direction near the final process of the Rhine concerned and two or more \*\* picking is made, horizontal ruled line processing (scoring) is performed if needed. This slitting machine has two or more slitting machine knife groups which consist of a slitting machine knife of the pair arranged due to the upper and lower sides which face across feed Rhine of a corrugated paper sheet crosswise [ of a corrugated paper sheet ] (the feed direction and crossing direction). Both the slitting machine knife of each slitting machine knife group is constituted possible [ positioning ] by the non-processed location which made the edge of a blade estrange up and down from feed Rhine, and the processing location with which the edge of a blade was made only for predetermined die length to lap while it rotates mutually in an opposite direction. And the corrugated paper sheet which passes through between both slitting machine knives is cut along the feed direction by positioning both the slitting machine knife in a processing location.

[0003] It is necessary to change the number of \*\* picking from said continuous corrugated paper sheet, and the width method of each sheet by which \*\* picking is carried out (the so-called "order modification"), and this order change is made by carrying out migration adjustment of said each slitting machine knife group crosswise [ sheet ]. That is, where the slitting machine knife which attends a processing location by order modification command is evacuated to a non-processed location, after moving each slitting machine knife group to the cutting location of new order, a corrugated paper sheet can be cut by new order by positioning a slitting machine knife in a processing location. In this case, while moving a slitting machine knife group to the cutting location of new order from the cutting location of the old order, since cutting with a slitting machine knife is in a impossible condition, it is necessary to stop a production line, and there is a problem to which production efficiency falls. Then, while arranging two sets of slitting machines to a serial in the feed direction and cutting the corrugated paper sheet in one 1st unit, justifying each slitting machine knife group in the 2nd unit in un-working [ of another side ] next time for order is performed. Thereby, while evacuating each slitting machine knife of the 1st unit to a non-processed location on the occasion of order modification, by making a processing location face each slitting machine knife of the 2nd unit, it can respond to order modification promptly and a halt of a production line can be avoided.

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## EFFECT OF THE INVENTION

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[Effect of the Invention] As explained above, even if it is one set of a slitting machine, according to the operating method of the slitting machine concerning this invention, it can respond to order modification according to generating of a defective comparable as the case where two sets of slitting machines have been arranged. That is, while being able to short-\*\*\*\* the overall length of a colgater line and being able to reduce facility cost, a deployment of the tooth space in works can be aimed at. Moreover, since separation

removal of the piece of a trim produced from a corrugated paper sheet can be certainly carried out from a sheet, the monitor by the operator is not needed but it becomes possible to attain full automation of Rhine. Furthermore, since the roll group which gives scoring also makes it move to a corrugated paper sheet with a processing condition, it can respond to order modification, without preparing two sets of scorekeepers, and facility cost can be reduced for the overall length of Rhine with short hiding \*\*\*\*.

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## TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] However, even if it is the case where change two sets of slitting machines and it operates, producing the defective of requirements on the occasion of order modification is not avoided. That is, it was difficult they to have made completely in agreement the cutting trailer produced on a corrugated paper sheet by evacuating the slitting machine knife of the 1st unit to a non-processed location and the cutting leader produced on a corrugated paper sheet by making a processing location face the slitting machine knife of the 2nd unit, since the 1st unit and the 2nd unit are arranged with necessary spacing, the necessary error was produced and the part had become a defective. Moreover, since the air cylinder is used as a means which changes a slitting machine knife to a processing location and a non-processed location, a necessary time delay is produced to change timing, and, thereby, a defective is generated. Furthermore, in cutting with an up-and-down slitting machine knife, since cutting of a corrugated paper sheet was not made, after positioning it in a processing location, it required necessary cutting-edge doubling time amount, and was to produce a defective in the meantime, if cutting-edge doubling of both the knives is not carried out correctly.

[0005] Thus, the present condition is being unable to prevent generating of the defective for order modification completely, even if it is the configuration which arranges two sets of slitting machines. And it was inherent to arrange two slitting machines in the point that facility cost increases, and the problem that the overall length of Rhine becomes long and a deployment of the tooth space in works cannot be aimed at.

[0006] Moreover, when performing two or more dish picking from a continuous corrugated paper sheet, in the both-ends edge in the cross direction of this sheet, a large and small garbage arises according to the finished size of a web material, and this part is cut by the slitting machine knife group located in the maximum outside in a slitting machine at it (trimming). And the garbage (piece of a trim) by which trimming was carried out is attracted by the suction means formed in the downstream, and separation removal is carried out from a corrugated paper sheet. In this case, if the cutout dimension by the slitting machine is conventionally changed by order modification, since said slitting machine knife will evacuate to a non-processed location, said piece of a trim has become [ connecting with a corrugated paper sheet with as, and ]. Therefore, the trim shear equipment for cutting the piece of a trim in the feed direction and the direction which intersects perpendicularly, and dissociating from a corrugated paper sheet was needed, and while the device became complicated, there was a fault in which cost increases.

[0007] Furthermore, the width method of the piece of a trim might become large, and when a production rate was a high speed, the situation of having not attracted the start

edge of the piece of a trim after order modification with said suction means, and stopping Rhine by the suction mistake of this piece of a trim might be caused, and production efficiency might fall. That is, the actual condition is that the operator is supervising the suction mistake of said piece of a trim in a colgater line, and this had become the obstruction of full automation.

[0008]

[Objects of the Invention] In view of a technical problem inherent in the slitting machine mentioned above, this invention is proposed so that it may solve this suitably, reduction of facility cost and improvement in space efficiency can be aimed at, and it aims at offering a means by which positive separation removal of the piece of a trim from a corrugated paper sheet is performed collectively, and full automation of Rhine can be attained.

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## MEANS

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[Means for Solving the Problem] In order to conquer said technical problem and to attain the desired end, the operating method of the slitting machine concerning this invention In the slitting machine equipped with two or more cutting means to cut the corrugated paper sheet supplied from a colgater line in the feed direction, free [ migration in the feed direction of a corrugated paper sheet, and the crossing direction ] When order modification of a cutout dimension is produced on said corrugated paper sheet, it is characterized by turning to the cutting location of new order a having held in processing location which cuts this sheet's cutting means, and making it move it at the rate of necessary.

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## OPERATION

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[Function of Example(s)] Next, it explains per operation of the slitter scorer equipment concerning an example. In addition, in the order of the present (old things), as shown in drawing 6 (a), all the slitting machine knife groups 24 in a slitting machine 18 shall be used, and four-dish picking of the corrugated paper sheet 12 shall be performed. Moreover, all shall be used and necessary scoring shall be given to the corrugated paper sheet 12 also for scorekeepers' 14 and 16 roll group 53.

[0025] If the command which picks three dishes in the corrugated paper sheet 12 by order modification is emitted in this condition, the slitting machine knives 20 and 22 in the central slitting machine knife group 24 will be evacuated from a processing location to a non-processed location by energization of cylinders 46 and 46. Moreover, the other slitting machine knife groups 24 are in a condition [ having held the slitting machine knives 20 and 22 in the processing location ], and are moved at the rate which is proportional to a sheet feed rate to the cutting location of new \*\* order by carrying out drive control of the servo motor 40 of correspondence by the control unit 42. That is, the corrugated paper sheet 12 with which it is fed will be aslant cut, as a two-dot chain line shows drawing 6 (b). And if each slitting machine knife group 24 arrives at the cutting location of new order, respectively, a servo motor 40 will be suspended and positioning of the knife group 24 will be completed (refer to drawing 6 (c)).

[0026] Moreover, also in said scorekeepers 14 and 16, while evacuating the ruled line rolls 51 and 52 of the roll group 53 which become unnecessary to a non-processed location, it is in a condition [ having held the ruled line rolls 51 and 52 in the processing location in the other roll groups 53 ], and is moved to the scoring location of new order at the rate proportional to a sheet feed rate.

[0027] Therefore, while the future corrugated paper sheets 12 pick three dishes by 3 sets of slitting machine knife groups 24, scoring by the roll group 53 is given to the necessary location of this sheet 12. In addition, the amount of the defective produced at the time of the change to new order from the old order can be made into the amount which hardly changes to the case where two sets of slitting machines have been arranged to the serial by having set up so that the slitting machine knife group 24 might be moved at the rate proportional to a sheet feed rate. Moreover, cutting of the corrugated paper sheet 12 which the slitting machine knife group 24 is moving is also good, and the load to a migration device is also pressed down in tolerance.

[0028] In addition, in new order, justification for the order to which the slitting machine knife group 24 and the roll group 53 in un-working [ which becomes unnecessary ] are needed for a degree is performed beforehand. In this case, even if the justification rate of each class 24 and 53 which can be set is a rate proportional to a sheet feed rate, it may be a fixed rate set up beforehand. moreover, the slitting machine knife group 24 and the roll group 53 to which each slitting machine knife group 24 and the roll group 53 are located in the both sides on the occasion of order modification with the slitter scorer equipment 10 of an example on the basis of the center of the cross direction of the corrugated paper sheet 12 -- relative -- contiguity and alienation -- it is controlled to move. Therefore, on the occasion of migration in the processing condition of each class 24 and 53, the load which joins the corrugated paper sheet 12 acts so that it may negate each other mutually on the basis of a center, and it has the advantage which can prevent generating of meandering of this sheet 12. Thereby, the required meandering arrester can be omitted conventionally and it becomes possible to attain simplification of a device.

[0029] With said slitter scorer equipment 10, the order which does not produce a garbage is in the crosswise both ends of the corrugated paper sheet 12, the slitting machine knife groups 24 and 24 of the maximum outside in a slitting machine 18 are moved outside the edge of the corrugated paper sheet 12 at this time, and trimming of the pieces 12a and 12a of a trim is performed. When the need of trimming the pieces 12a and 12a of a trim of necessary width of face by order modification is produced from such a condition, as shown in drawing 7 , the slitting machine knife groups 24 and 24 of the maximum outside are moved inside from the outside of the corrugated paper sheet 12, holding the slitting machine knives 20 and 22 in a processing location. In addition, the passing speed at this time is set as the rate which is proportional to a sheet feed rate as mentioned above.

[0030] After the edge section of the corrugated paper sheet 12 was cut aslant and these knife groups 24 and 24 arrived at the cutting location of the order concerned, trimming of the piece of trim 12a of a necessary width method is carried out by migration of said slitting machine knife groups 24 and 24. And as shown in drawing 3 R> 3 and drawing 4 , suction removal of each piece of trim 12a by which trimming was carried out is carried out from the corrugated paper sheet 12 with the trim duct 50 of the correspondence located in the lower stream of a river of a slitting machine 18. In addition, since the

cutting leader of piece of trim 12a is aslant cut so that it may become necessary width of face from a thin condition gradually, this leader is certainly attracted by the trim duct 50, and does not produce a suction mistake. That is, it becomes the monitor of the suction mistake by the operator is unnecessary, and possible to attain full automation of Rhine. [0031] And the pieces 12a and 12a of a trim to which the slitting machine knife groups 24 and 24 of the maximum outside move, and trimming is carried out for every necessary order modification will be in the condition that all were connected as shown in drawing 7, and each piece of trim 12a will be continuously attracted by the suction duct 50. And when changed into the order which does not need cutting of piece of trim 12a again, in order that the slitting machine knife groups 24 and 24 of the maximum outside may move outside from the inside of the corrugated paper sheet 12, the pieces 12a and 12a of a trim are completely separated from the corrugated paper sheet 12. Therefore, the trim shear equipment which was the need conventionally can be made unnecessary.

[0032] In addition, although the example explained per [ equipped with the device in which a processing location and a non-processed location are made to go up and down the slitting machine knives 20 and 22 and the ruled line rolls 51 and 52 ] thing, these elevator styles are not the indispensable requirements for this application, and can omit this device. Moreover, although considered as the configuration which cuts the corrugated paper sheet 12 with the up-and-down slitting machine knives 20 and 22 in the slitting machine 18, while arranging a slitting machine knife in the bottom, for example on both sides of the corrugated paper sheet 12, the configuration of the one-sheet cutting edge which arranges a cradle in the bottom is also employable. Furthermore, as for the passing speed of said slitting machine knife group 24 and roll group 53, it is possible to also make it move at a sheet feed rate and a not proportional rate according to a class or meteorological conditions of the quality of paper of the sheet which it is not limited to the rate proportional to the sheet feed rate mentioned above, and is processed, and a flute (height of humidity etc.) etc. For example, passing speed is beforehand set up for every monograph affair, and the slitting machine knife group 24 and the roll group 53 are moved at the rate beforehand set up regardless of the height of a sheet feed rate on the occasion of order modification. Moreover, when you do not need process tolerance, it sets passing speed as a high speed, and when you need process tolerance, you may set passing speed as a low speed.

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#### EXAMPLE

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[Example] Next, about the operating method of the slitting machine concerning this invention, a suitable example is given, and it explains below, referring to an accompanying drawing. In addition, in invention concerning claim 1 and claim 2 of this application, although an example mentions and explains the slitter scorer equipment which put the slitting machine and the scorekeeper side by side to the serial, even if it is a slitting machine independent machine, it can carry out.

[0011] The slitter scorer equipment 10 of illustration equips the downstream with one set of a slitting machine 18 while equipping the feed direction upstream of the corrugated paper sheet 12 with two sets of scorekeepers 14 and 16. The slitting machine 18 is equipped with two or more sets (an example 5 sets) of slitting machine knife groups



(cutting means) 24 which consist of disc-like slitting machine knives 20 and 22 which make the pair which is up-and-down relation and rotates mutually in an opposite direction on both sides of the pass line PL of the corrugated paper sheet 12 crosswise [ of the corrugated paper sheet 12 ] (refer to drawing 2 ). And this sheet 12 is cut in the feed direction by supplying the corrugated paper sheet 12 among the slitting machine each knives 20 and 22. between the processing location where the slitting machine knives 20 and 22 of each slitting machine knife group 24 cut the corrugated paper sheet 12, and the non-processed locations estranged from this sheet 12 -- rise and fall -- it is constituted movable, and each slitting machine knife group 24 is arranged crosswise mutually free [ migration ], and it is constituted so that positioning adjustment may be carried out according to modification of the number of \*\* picking by order modification, or \*\* picking width of face. Then, lessons is taken from the elevator style of the slitting machine knives 20 and 22, and the migration device of the slitting machine knife group 24, and it explains.

[0012] That is, among the frames 26 and 26 estranged and arranged in the slitter scorer equipment 10 actuation-side and the driving side, as shown in drawing 2 , predetermined spacing alienation is carried out and the beams 28 and 30 of a pair are constructed over the upper and lower sides which sandwich the pass line PL of said corrugated paper sheet 12 in parallel. And the up knife support unit 32 of the same number as the slitting machine knife group 24 is arranged free [ migration ] by the upper beam 28. Each up knife support unit 32 equips the guide rails 34 and 34 of the pair arranged in parallel with a beam 28 with the migration member 36 arranged free [ sliding ], and the \*\*\*\* shaft 38 which carried out construction immobilization is screwed in by the nut (not shown) arranged in this migration member 36 at both the frames 26 and 26. Moreover, the servo motor 40 in which variable speed control is possible is arranged by the migration member 36, and by rotating a nut with this servo motor 40, the migration member 36 is \*\*\*\*ed, and it is constituted so that it may be made to move in accordance with a shaft 38. In addition, drive control is carried out according to an individual by the control device 42 mentioned later, respectively, and the servo motor 40 of each up knife support unit 32 is set up so that the migration member 36 may be moved at the rate proportional to the feed rate (line speed) of the corrugated paper sheet 12.

[0013] As shown in drawing 1 , a holder 44 is arranged free [ tilting ] by the lower part of said migration member 36, and is arranged in this holder 44 free [ rotation of the disc-like slitting machine knife 20 ]. And in proportion to the operating speed of a colgater, the rotation drive of this slitting machine knife 20 is carried out. Moreover, a cylinder 46 is arranged by the migration member 36 possible [ tilting ], and piston rod 46a of this cylinder 46 is supported pivotably in the holder 44. That is, by energizing a cylinder 46 to forward hard flow, and carrying out tilt of the holder 44, it is constituted so that said slitting machine knife 20 can be positioned in the processing location which cuts the corrugated paper sheet 12, and the non-processed location estranged from a pass line PL to the upper part.

[0014] As shown in drawing 1 , the lower knife support unit 48 of a configuration of becoming symmetrical up and down corresponding to each up knife support unit 32 arranged in the upper beam 28 is arranged by the beam 30 of said bottom. And this sheet 12 is cut in the feed direction by supplying the corrugated paper sheet 12 among the

slitting machine knives 20 and 22 positioned in the processing location in the units 32 and 48 of the corresponding upper and lower sides. Moreover, the slitting machine knife 22 of the lower knife support unit 48 is evacuated from a processing location to a downward non-processed location from the pass line PL of the corrugated paper sheet 12. In addition, about each part material of the lower knife support unit 48, the same sign as the same member to which the up knife support unit 32 corresponds is attached.

[0015] By four sets of the knife support units 32, 48, 32, and 48 located in the maximum outside of the cross direction in said slitting machine 18, the device in which you made it go up and down between a processing location and a non-processed location was omitted in the slitting machine knives 20, 22, 20, and 22 of each correspondence, and the slitting machine knives 20 and 22 which make a pair by the upper and lower sides are always positioned in the processing location. That is, since it is what is used in case the garbage produced at the both-ends edge in the cross direction of the corrugated paper sheet 12 is trimmed, in case it is the order which a garbage does not produce, trimming of two sets of the slitting machine knife groups 24 and 24 located in the maximum outside is not carried out by making it move to the outside which does not contact the corrugated paper sheet 12.

[0016] In under surface than the pass line PL of the corrugated paper sheet 12, the trim ducts 50 and 50 (only one side is illustrated) connected in the source of suction which is not illustrated are arranged in the slitting machine knife groups 24 and 24 of the maximum outside, and a corresponding location by the downstream of said slitting machine 18. And the pieces 12a and 12a of a trim which it is cut by the slitting machine knife groups 24 and 24 of this \*\*, and are produced from the corrugated paper sheet 12 by these trim ducts 50 and 50 are attracted, and separation removal is carried out from this sheet 12. In addition, long picture piece of trim 12a attracted by the trim duct 50 is discarded after being cut by the short length piece with the cutter equipment which is not illustrated. As shown in drawing 3, said trim duct 50 is arranged by the holder 44 of the slitting machine knife 22 of the bottom in the slitting machine knife group 24 of the maximum outside, and it is constituted so that it may move in one with this knife 22. That is, when the number of \*\* picking and the other \*\* picking width of face of the corrugated paper sheet 12 are changed, the trim duct 50 moves in one with the slitting machine knife 22, and it is constituted so that piece of trim 12a may be attracted certainly. In addition, in drawing 3, a sign 49 shows the guide plate which supports the edge section of the corrugated paper sheet 12, and this guide plate 49 moves it in one with the slitting machine knife 22.

[0017] Two sets of the basic configuration of the scorekeepers 14 and 16 stationed at the upstream of said slitting machine 18 are the same as that of a slitting machine 18, and it differs in that replace with the slitting machine knives 20 and 22, and the ruled line rolls 51 and 52 are arranged. In addition, since the configuration of two sets of scorekeepers 14 and 16 is the same, it shall explain per configuration of the scorekeeper 14 located in the feed direction upstream, and the same sign shall be given to the same member of the scorekeeper 16 of the downstream.

[0018] On both sides of the pass line PL of the corrugated paper sheet 12, said scorekeeper 14 is up-and-down relation, and has two or more sets (an example 4 sets) of roll groups 53 which consist of ruled line rolls 51 and 52 which make the pair which

rotates mutually in an opposite direction crosswise [ of the corrugated paper sheet 12 ]. And scoring is given to this sheet 12 in the feed direction by supplying the corrugated paper sheet 12 among the ruled line rolls 51 and 52 which make a pair. between the processing location where the ruled line rolls 51 and 52 of each roll group 53 give scoring to the corrugated-paper sheet 12, and the non-processed locations which do not give scoring to this sheet -- rise and fall -- it is constituted movable, and each roll group 53 is arranged crosswise mutually free [ migration ], and it is constituted so that positioning adjustment may be carried out according to modification of the number of \*\* picking by order modification, or \*\* picking width of face. Then, lessons is taken from the elevator style of the ruled line rolls 51 and 52, and the migration device of the roll group 53, and it explains.

[0019] That is, among said frames 26 and 26, predetermined spacing alienation is carried out and the beams 54 and 56 of a pair are constructed over the upper and lower sides which sandwich the pass line PL of said corrugated paper sheet 12 in parallel. And the up roll support unit 57 of the same number as the roll group 53 is arranged free [ migration ] by the upper beam 54. Each up roll support unit 57 equips the guide rails 58 and 58 of the pair arranged in parallel with a beam 54 with the migration member 59 arranged free [ sliding ], and the \*\*\*\* shaft 60 which carried out construction immobilization is screwed in by the nut (not shown) arranged in this migration member 59 at both the frames 26 and 26. Moreover, the servo motor 61 in which variable speed control is possible is arranged by the migration member 59, and by rotating a nut with this servo motor 61, the migration member 59 is \*\*\*\*ed, and it is constituted so that it may be made to move in accordance with a shaft 60. In addition, drive control of the servo motor 61 of each up roll support unit 57 is carried out according to an individual by said control unit 42, respectively.

[0020] A holder 62 is arranged free [ tilting ] by the lower part of said migration member 59, and is arranged in this holder 62 free [ rotation of the disc-like ruled line roll 51 ]. And in proportion to the operating speed of a colgater, the rotation drive of this ruled line roll 51 is carried out. Moreover, a cylinder 63 is arranged by the migration member 59 possible [ tilting ], and piston rod 63a of this cylinder 63 is supported pivotably in the holder 62. That is, by energizing a cylinder 63 to forward hard flow, and carrying out tilt of the holder 62, it is constituted so that said ruled line roll 51 can be positioned in the processing location which gives scoring to the corrugated paper sheet 12, and the non-processed location estranged from a pass line PL to the upper part.

[0021] The lower roll support unit 64 of a configuration of becoming symmetrical up and down corresponding to each up roll support unit 57 arranged in the upper beam 54 is arranged by the beam 56 of said bottom. And scoring is given to this sheet 12 by supplying the corrugated paper sheet 12 among the ruled line rolls 51 and 52 positioned in the processing location in the units 57 and 64 of the corresponding upper and lower sides. Moreover, the ruled line roll 52 of the lower roll support unit 64 is set as the corrugated paper sheet 12 from the processing location which gives scoring more possible [ evacuation in a downward non-processed location ] than a pass line PL. In addition, about each part material of the lower roll support unit 64, the same sign as the same member to which the up roll support unit 57 corresponds is attached.

[0022] Drawing 5 shows the control circuit 65 of slitte scorer equipment 10, this circuit

65 builds in a control unit 42, and each servo motor 40 of each of said knife support units 32 and 48 is connected to this control unit 42 through the servo drive unit 66, respectively. Moreover, the location detection means 69 arranged in each servo motor 40 is connected to the servo drive unit 66 of correspondence. Furthermore, the high order production-control equipment 68 which manages the general-purpose actuation units 67, such as \*\* keyboard arranged in the control panel (not shown) of slitter scorer equipment 10 and a touch panel, and the whole colgater line is connected to the control unit 42. Furthermore, it has connected also with the rotation pulse generator 70 which actually detects the double facer or sheet rate which is not illustrated. And while data, such as a cutting location of each slitting machine knife group 24 corresponding to each order and a scoring location of each roll group 53, are beforehand inputted by the general-purpose actuation unit 67, the same command is taken out also from high order production-control equipment 68, and the feed rate of the corrugated paper sheet 12 is also given. In addition, although not illustrated, the servo motor 61 to which each roller support units 57 and 64 of SUKORAA 14 and 16 are moved is also connected to the control unit 42 through the servo drive unit.

[0023] That is, when order modification is produced in the cutout dimension of the corrugated paper sheet 12, operation data processing of the order substitute stage, rate command, and location command which were set up based on the feed rate of the corrugated paper sheet 12 inputted from said high order production-control equipment 68 is carried out via a control device 42, and they are outputted to each servo drive unit 66. Thereby, drive control of each servo motor 40 is carried out, and each slitting machine knife group 24 is moved to the cutting location of new order at the rate proportional to the feed rate of the corrugated paper sheet 12. In addition, the passing speed of the slitting machine knife group 24 can stop the yield of the defective produced in the case of order modification few, for example, is set as  $1/6 - 1/10$  of a sheet feed rate while it can move, where good cutting of the corrugated paper sheet 12 with the slitting machine knives 20 and 22 is maintained. Moreover, if it is this rate, the load which joins a migration device can also be pressed down to tolerance.

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## DESCRIPTION OF DRAWINGS

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### [Brief Description of the Drawings]

[Drawing 1] It is the outline side elevation showing the slitter scorer equipment concerning an example.

[Drawing 2] It is the outline front view showing the slitting machine in the slitter scorer equipment concerning an example.

[Drawing 3] It is the outline side elevation showing the slitting machine knife group which trims the garbage of a corrugated paper sheet, and a trim duct.

[Drawing 4] It is the outline top view showing the slitting machine knife group which trims the garbage of a corrugated paper sheet, and a trim duct.

[Drawing 5] It is the block diagram showing the control circuit of the slitter scorer equipment concerning an example.

[Drawing 6] It is the explanatory view of the slitting machine knife group in the case of changing the number of \*\* picking of a corrugated paper sheet by order modification,

and a roll group of operation.

[Drawing 7] It is the explanatory view of the slitting machine knife group in the case of trimming a garbage from a corrugated paper sheet of operation.

[Description of Notations]

12 Corrugated Paper Sheet

24 Slitting Machine Knife Group

53 Roll Group

PL Pass line

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## CORRECTION OR AMENDMENT

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[Proposed Amendment]

[Claim(s)]

[Claim 1] In the slitting machine equipped with two or more cutting means (24) to cut the corrugated paper sheet (12) supplied from a colgater line in the feed direction, free

[ migration in the feed direction of a corrugated paper sheet (12), and the crossing direction ] The operating method of the slitting machine characterized by turning to the cutting location of new order a having held in processing location which cuts this sheet's (12)'s when order modification of cutout dimension is produced on said corrugated paper sheet (12) cutting means (24), and making it move it at the rate of necessary.

[Claim 2] A cutting means (24) to trim the garbage of the both-ends edge in the cross direction of said corrugated paper sheet (12) While moving inside from the crosswise

outside which does not contact a corrugated paper sheet (12) at the rate of necessary and starting trimming in the condition [ being held in the processing location which cuts a sheet (12) ] The operating method of the slitting machine according to claim 1 which ends trimming by moving outside at the rate of necessary from the condition of performing trimming.

[Claim 3] The operating method of the slitting machine according to claim 1 or 2 it was made to make it move to this sheet (12) at the rate of necessary towards the scoring location of new order in the condition [ having held in the processing location which gives scoring ] when order modification of a cutout dimension was produced for two or more roll groups (53) which give scoring of the feed direction to the corrugated paper sheet (12) supplied from said colgater line on said corrugated paper sheet (12).

[Claim 4] A cutting means (24) to trim the garbage of the both-ends edge in the cross direction of said corrugated paper sheet (12) While moving inside from the crosswise outside which does not contact a corrugated paper sheet (12) at the rate of  $1/6 - 1/10$  of a sheet feed rate and starting trimming in the condition [ being held in the processing location which cuts a sheet (12) ] The operating method of the slitting machine according to claim 1 or 2 which ends trimming by moving outside from the condition of performing trimming, at the rate of  $1/6 - 1/10$  of a sheet feed rate.

[Claim 5] In the slitting machine equipped with two or more cutting means (24) to cut the corrugated paper sheet (12) supplied from a colgater line in the feed direction, free [ migration in the feed direction of a corrugated paper sheet (12), and the crossing direction ] When order modification of a cutout dimension is produced on said corrugated paper sheet (12) A having held in processing location which cuts this sheet's (12)'s cutting means (24), The operating method of the slitting machine characterized by turning the bottom slitting machine knife (22) of this cutting equipment (24), and a trim duct (50) movable in one to the cutting location of new order, and making it move them in one at the rate of necessary.

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[Translation done.]

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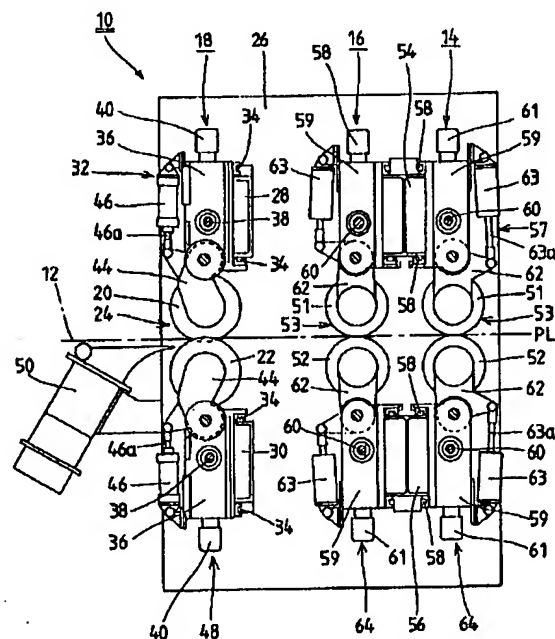
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(54)【発明の名称】 スリッタの運転方法

(57)【要約】

【目的】 設備コストの低減およびスペース効率の向上を図る。

【構成】 加工位置に位置決めしたスリッタナイフ 20, 22 の間に供給される段ボールシート 12 は、その給送方向に沿って切断される。段ボールシート 12 に切断寸法の変更を生じた場合は、スリッタナイフ 20, 22 を加工位置に保持したままの状態、スリッタナイフ組 24 を新オーダの切断位置に段ボールシート 12 の給送速度に比例した速度で移動させる。従って、1 基のスリッタによりオーダ変更に対応し得る。



#### 【特許請求の範囲】

【請求項1】 コルゲータラインから供給される段ボールシート(12)を給送方向に切断する複数の切断手段(24)を、段ボールシート(12)の給送方向と交差する方向に移動自在に備えたスリッタにおいて、前記段ボールシート(12)に切断寸法のオーダ変更を生じたときには、該シート(12)を切断する加工位置に保持したままの切断手段(24)を、新オーダの切断位置に向けて所要の速度で移動させるようにしたことを特徴とするスリッタの運転方法。

【請求項2】 前記段ボールシート(12)の幅方向における両端縁部の不要部分をトリミングする切断手段(24)は、シート(12)を切断する加工位置に保持されたままの状態、所要の速度で段ボールシート(12)に接触しない幅方向外側から内側に移動してトリミングを開始すると共に、トリミングを行なっている状態から所要の速度で外側に移動することによりトリミングを終了するようになっている請求項1記載のスリッタの運転方法。

【請求項3】 前記コルゲータラインから供給される段ボールシート(12)に給送方向のスコアリングを施す複数のローラ組(53)を、前記段ボールシート(12)に切断寸法のオーダ変更を生じたときに、該シート(12)にスコアリングを施す加工位置に保持したままの状態、新オーダのスコアリング位置に向けて所要の速度で移動させるようにした請求項1または2記載のスリッタの運転方法。

#### 【発明の詳細な説明】

##### 【0001】

【産業上の利用分野】 この発明は、スリッタの運転方法に関し、更に詳細には、連続する段ボールシートを上下の関係で配設した一対のスリッタナイフで給送方向に切断するスリッタにおいて、切断寸法のオーダ変更を生じたときに、スリッタナイフを新オーダの切断位置に加工状態のまま移動させるようにしたスリッタの運転方法に関するものである。

##### 【0002】

【従来技術】 コルゲータラインで連続的に製造される段ボールシートは、当該ラインの最終工程付近でスリッタにより給送方向に沿って切断されて複数の丁取りがなされると共に、必要に応じて横野線加工(スコアリング)が行なわれる。このスリッタは、段ボールシートの給送ラインを挟む上下の関係で配設した一対のスリッタナイフからなるスリッタナイフ組を、段ボールシートの幅方向(給送方向と交差する方向)に複数備える。各スリッタナイフ組の両スリッタナイフは、相互に反対方向に回転されると共に、その刃先を給送ラインから上下に離間させた非加工位置と、その刃先を所定長さだけ重なるようにした加工位置とに位置決め可能に構成される。そして、両スリッタナイフを加工位置に位置決めすることにより、両スリッタナイフの間を通過する段ボールシートは給送方向に沿って切断される。

【0003】 前記連続した段ボールシートからの丁取り数や丁取りされる各シートの幅寸法を変更(いわゆる「オーダ変更」)する必要がある、このオーダ変更は、前記各スリッタナイフ組をシート幅方向に移動調整することにより行なわれる。すなわち、オーダ変更指令により加工位置に臨むスリッタナイフを非加工位置に退避させた状態で、各スリッタナイフ組を新オーダの切断位置に移動させた後、スリッタナイフを加工位置に位置決めすることにより、段ボールシートを新オーダで切断することができる。この場合において、スリッタナイフ組を旧オーダの切断位置から新オーダの切断位置に移動させる間は、スリッタナイフによる切断が不能な状態であるため生産ラインを停止する必要がある、生産能率が低下する問題がある。そこで、2基のスリッタを給送方向に直列に配置し、一方の第1ユニットで段ボールシートの切断を行なっている間に、他方の非稼働中の第2ユニットにおいて各スリッタナイフ組を次回オーダのために位置調整することが行なわれている。これにより、オーダ変更の際、第1ユニットの各スリッタナイフを非加工位置に退避させると共に、第2ユニットの各スリッタナイフを加工位置に臨ませることにより、オーダ変更に対応して生産ラインの停止を回避することができる。

##### 【0004】

【発明が解決しようとする課題】 しかしながら、2基のスリッタを切替えて運転する場合であっても、オーダ変更の際には所要量の不良品を生ずるのは避けられない。すなわち、第1ユニットと第2ユニットとは所要の間隔をもって配置されているため、例えば第1ユニットのスリッタナイフを非加工位置に退避させることにより段ボールシートに生ずる切断終端部と、第2ユニットのスリッタナイフを加工位置に臨ませることにより段ボールシートに生ずる切断始端部とを完全に一致させることは困難で、所要の誤差を生じてその部分が不良品となっていた。また、スリッタナイフを加工位置と非加工位置とに切替える手段としてエアシリンダが使用されているため、切替えタイミングに所要の遅れ時間を生じ、これにより不良品が発生する。更に、上下のスリッタナイフによる切断では、両ナイフを正確に刃合わせしなければ段ボールシートの切断はなされないため、加工位置に位置決めした後には所要の刃合わせ時間を要し、この間は不良品を生ずることとなっていた。

【0005】 このように、2基のスリッタを配置する構成であっても、オーダ変更の際には不良品の発生を完全に防止することはできないのが現状である。しかもスリッタを2基配置することは、設備コストが嵩む点と、ラインの全長が長くなって工場内スペースの有効利用が図れないという問題を内在していた。

【0006】 また、連続する段ボールシートから複数丁取りを行なう場合、該シートの幅方向における両端縁部には、シート材の仕上寸法に応じて大小の不要部分が生



じ、該部分はスリッタにおける最外側に位置するスリッタナイフ組により切断(トリミング)されるようになってい。そしてトリミングされた不要部分(トリム片)は、下流側に設けた吸引手段により吸引されて段ボールシートから分離除去される。この場合において、従来はオーダ変更によりスリッタによる切断寸法が変更されると、前記スリッタナイフは非加工位置に退避するため、前記トリム片は段ボールシートに接続されたままとなっている。そのため、トリム片を給送方向と直交する方向に切断して段ボールシートから分離するためのトリムシャー装置が必要となり、機構が複雑になると共にコストが高む欠点があった。

【0007】更に、トリム片の幅寸法が大きくなり、生産速度が高速の場合には、オーダ変更後のトリム片の始端を前記吸引手段で吸引し得ないことがあり、このトリム片の吸引ミスによってラインを停止させる事態を招いて生産能率が低下することがあった。すなわち、コルゲータラインにおいては前記トリム片の吸引ミスを作業者が監視しているのが実情であり、これが無人化の障壁となっていた。

【0008】

【発明の目的】この発明は、前述したスリッタに内在している課題に鑑み、これを好適に解決するべく提案されたものであって、設備コストの低減およびスペース効率の向上を図ることができ、併せて段ボールシートからのトリム片の確実な分離除去を行なってラインの無人化を達成し得る手段を提供することを目的とする。

【0009】

【課題を解決するための手段】前記課題を克服し、所期の目的を達成するため、本発明に係るスリッタの運転方法は、コルゲータラインから供給される段ボールシートを給送方向に切断する複数の切断手段を、段ボールシートの給送方向と交差する方向に移動自在に備えたスリッタにおいて、前記段ボールシートに切断寸法のオーダ変更を生じたときには、該シートを切断する加工位置に保持したままの切断手段を、新オーダの切断位置に向けて所要の速度で移動させるようにしたことを特徴とする。

【0010】

【実施例】次に、本発明に係るスリッタの運転方法につき、好適な実施例を挙げて、添付図面を参照しながら以下説明する。なお、実施例ではスリッタおよびスコアラを直列に併設したスリッタ・スコアラ装置を挙げて説明するが、本願の請求項1および請求項2に係る発明においては、スリッタ単独機であっても実施し得るものである。

【0011】図示のスリッタ・スコアラ装置10は、段ボールシート12の給送方向上流側に2基のスコアラ14、16を備えると共に、その下流側に1基のスリッタ18を備えている。スリッタ18は、段ボールシート12のパスラインPLを挟んで上下の関係で、相互に反対

方向に回転する対をなす円盤状のスリッタナイフ20、22からなるスリッタナイフ組(切断手段)24を、段ボールシート12の幅方向に複数組(実施例では5組)備えている(図2参照)。そして、各対応のスリッタナイフ20、22の間に段ボールシート12を供給することにより、該シート12は給送方向に切断される。各スリッタナイフ組24のスリッタナイフ20、22は、段ボールシート12を切断する加工位置と、該シート12から離間する非加工位置との間を昇降移動可能に構成され、また各スリッタナイフ組24は、幅方向に相互に移動自在に配設されて、オーダ変更による丁取り数や丁取り幅の変更に応じて位置決め調整されるよう構成される。そこで、スリッタナイフ20、22の昇降機構とスリッタナイフ組24の移動機構とにつき説明する。

【0012】すなわち、スリッタ・スコアラ装置10の操作側および駆動側に離間して配設したフレーム26、26の間には、図2に示す如く、前記段ボールシート12のパスラインPLを挟む上下に所定間隔離間して一对のビーム28、30が平行に架設されている。そして上側のビーム28に、スリッタナイフ組24と同一数の上部ナイフ支持ユニット32が移動自在に配設されている。各上部ナイフ支持ユニット32は、ビーム28に平行に配設した一对のガイドレール34、34に摺動自在に配設した移動部材36を備え、この移動部材36に配設したナット(図示せず)に、両フレーム26、26に架設固定したねじ軸38が螺挿されている。また、移動部材36には可変速制御可能なサーボモータ40が配設され、該サーボモータ40によりナットを回転させることにより、移動部材36をねじ軸38に沿って移動させるよう構成される。なお、各上部ナイフ支持ユニット32のサーボモータ40は、後述する制御装置42により夫々個別に駆動制御され、移動部材36を段ボールシート12の給送速度(ライン速度)に比例した速度で移動するよう設定されている。

【0013】前記移動部材36の下部には、図1に示す如く、ホルダ44が傾動自在に配設され、該ホルダ44に円盤状のスリッタナイフ20が回転自在に配設されている。そしてこのスリッタナイフ20は、コルゲータの運転速度と比例して回転駆動されるようになっている。また移動部材36にシリンダ46が傾動可能に配設され、該シリンダ46のピストンロッド46aを、ホルダ44に枢支してある。すなわち、シリンダ46を正逆方向に付勢してホルダ44を傾動させることにより、前記スリッタナイフ20を、段ボールシート12を切断する加工位置と、パスラインPLから上方に離間する非加工位置とに位置決めし得るよう構成される。

【0014】前記下側のビーム30には、図1に示す如く、上側のビーム28に配設した各上部ナイフ支持ユニット32と対応して上下に対称となる構成の下部ナイフ支持ユニット48が配設されている。そして、対応する

上下のユニット32, 48における加工位置に位置決めしたスリッタナイフ20, 22の間に段ボールシート12を供給することにより、該シート12は給送方向に切断される。また、下部ナイフ支持ユニット48のスリッタナイフ22は、加工位置から段ボールシート12のパスラインPLより下方の非加工位置に退避するようになっている。なお、下部ナイフ支持ユニット48の各部材については、上部ナイフ支持ユニット32の対応する同一部材と同じ符号を付してある。

【0015】前記スリッタ18における幅方向の最外側に位置する4基のナイフ支持ユニット32, 48, 32, 48では、各対応のスリッタナイフ20, 22, 20, 22を、加工位置と非加工位置との間を昇降させる機構は省略され、上下で対をなすスリッタナイフ20, 22を常に加工位置に位置決めしている。すなわち、最外側に位置する2基のスリッタナイフ組24, 24は、段ボールシート12の幅方向における両端縁部に生じる不要部分をトリミングする際に使用されるものであるため、不要部分が生じないオーダの際には、段ボールシート12と接触しない外側に移動させることによりトリミングさせないようにしている。

【0016】前記スリッタ18の下流側には、段ボールシート12のパスラインPLより下側において、最外側のスリッタナイフ組24, 24と対応する位置に、図示しない吸引源に接続されたトリムダクト50, 50(一方のみ図示)が配設される。そしてこのトリムダクト50, 50で、当該のスリッタナイフ組24, 24により切断されて段ボールシート12から生ずるトリム片12a, 12aを吸引して該シート12から分離除去するようになっている。なお、トリムダクト50で吸引された長尺なトリム片12aは、図示しないカット装置により短尺な片に切断された後に廃棄される。前記トリムダクト50は、図3に示す如く、最外側のスリッタナイフ組24における下側のスリッタナイフ22のホルダ44に配設され、該ナイフ22と一体的に移動するよう構成される。すなわち、段ボールシート12の丁取り数その他丁取り幅が変更された際に、トリムダクト50はスリッタナイフ22と一体的に移動し、トリム片12aを確実に吸引するよう構成される。なお図3において符号49は、段ボールシート12の端縁部を支持するガイド板を示し、該ガイド板49はスリッタナイフ22と一体的に移動するようになっている。

【0017】前記スリッタ18の上流側に配置される2基のスコアラ14, 16は、その基本構成はスリッタ18と同一であって、スリッタナイフ20, 22に代えて野線ロール51, 52が配設されている点で異なっている。なお、2基のスコアラ14, 16の構成は同一であるので、給送方向上流側に位置するスコアラ14の構成につき説明し、下流側のスコアラ16の同一部材には同一の符号を付すものとする。

【0018】前記スコアラ14は、段ボールシート12のパスラインPLを挟んで上下の関係で、相互に反対方向に回転する対をなす野線ロール51, 52からなるロール組53を、段ボールシート12の幅方向に複数組(実施例では4組)備えている。そして、対をなす野線ロール51, 52の間に段ボールシート12を供給することにより、該シート12には給送方向にスコアリングが施される。各ロール組53の野線ロール51, 52は、段ボールシート12にスコアリングを施す加工位置と、該シートにスコアリングを施さない非加工位置との間を昇降移動可能に構成され、また各ロール組53は、幅方向に相互に移動自在に配設されて、オーダ変更による丁取り数や丁取り幅の変更に応じて位置決め調整されるよう構成される。そこで、野線ロール51, 52の昇降機構とロール組53の移動機構とにつき説明する。

【0019】すなわち、前記フレーム26, 26の間には、前記段ボールシート12のパスラインPLを挟む上下に所定間隔離間して一对のビーム54, 56が平行に架設されている。そして上側のビーム54に、ロール組53と同一数の上部ロール支持ユニット57が移動自在に配設されている。各上部ロール支持ユニット57は、ビーム54に平行に配設した一对のガイドレール58, 58に摺動自在に配設した移動部材59を備え、この移動部材59に配設したナット(図示せず)に、両フレーム26, 26に架設固定したねじ軸60が螺挿されている。また、移動部材59には可変速制御可能なサーボモータ61が配設され、該サーボモータ61によりナットを回転させることにより、移動部材59をねじ軸60に沿って移動させるよう構成される。なお、各上部ロール支持ユニット57のサーボモータ61は、前記制御装置42により夫々個別に駆動制御される。

【0020】前記移動部材59の下部に、ホルダ62が傾動自在に配設され、該ホルダ62に円盤状の野線ロール51が回転自在に配設されている。そして、この野線ロール51は、コルゲータの運転速度と比例して回転駆動されるようになっている。また移動部材59にシリンダ63が傾動可能に配設され、該シリンダ63のピストンロッド63aをホルダ62に枢支してある。すなわち、シリンダ63を正逆方向に付勢してホルダ62を傾動させることにより、前記野線ロール51を、段ボールシート12にスコアリングを施す加工位置と、パスラインPLから上方に離間する非加工位置とに位置決めし得るよう構成される。

【0021】前記下側のビーム56には、上側のビーム54に配設した各上部ロール支持ユニット57と対応して上下に対称となる構成の下部ロール支持ユニット64が配設されている。そして、対応する上下のユニット57, 64における加工位置に位置決めした野線ロール51, 52の間に段ボールシート12を供給することにより、該シート12にはスコアリングが施される。また、

下部ロール支持ユニット64の野線ロール52は、段ボールシート12にスコアリングを施す加工位置からパスラインPLより下方の非加工位置に退避可能に設定される。なお、下部ロール支持ユニット64の各部材については、上部ロール支持ユニット57の対応する同一部材と同じ符号を付してある。

【0022】図5はスリッタ・スコアラ装置10の制御回路65を示し、該回路65は制御装置42を内蔵し、この制御装置42には、前記各ナイフ支持ユニット32,48の各サーボモータ40が、サーボ駆動ユニット66を介して夫々接続されている。また、各サーボモータ40に配設した位置検知手段69が、対応のサーボ駆動ユニット66に接続されている。更に、制御装置42には、スリッタ・スコアラ装置10の操作パネル(図示せず)に配設した①キーボードやタッチパネル等の汎用操作ユニット67およびコルゲータラインの全体を管理する上位生産管理装置68が接続されている。更に、図示しないダブルフェーサまたはシート速度を実際に検出する回転パルス発生器70とも接続している。そして、汎用操作ユニット67により予め各オーダに対応する各スリッタナイフ組24の切断位置や、各ロール組53のスコアリング位置等のデータが入力されると共に、上位生産管理装置68からも同様の指令が出され、かつ段ボールシート12の給送速度も与えられる。なお、図示しないが、制御装置42にはスコアラ14,16の各ローラ支持ユニット57,64を移動させるサーボモータ61もサーボ駆動ユニットを介して接続されている。

【0023】すなわち、段ボールシート12の切断寸法にオーダ変更を生じた場合は、前記上位生産管理装置68から入力される段ボールシート12の給送速度に基づいて設定されたオーダ替え時期、速度指令および位置指令が、制御装置42を経由して演算データ処理されて、各サーボ駆動ユニット66に出力される。これにより、各サーボモータ40が駆動制御され、各スリッタナイフ組24を段ボールシート12の給送速度に比例した速度で新オーダの切断位置に移動させるようになっている。なお、スリッタナイフ組24の移動速度は、スリッタナイフ20,22による段ボールシート12の良好な切断を保った状態で移動し得ると共に、オーダ変更の際に生ずる不良品の発生量を少なく抑えることができる、例えばシート給送速度の1/6~1/10に設定される。またこの速度であれば、移動機構に加わる負荷も許容範囲に抑えることができるものである。

#### 【0024】

【実施例の作用】次に、実施例に係るスリッタ・スコアラ装置の作用につき説明する。なお、現在(旧)のオーダでは、図6(a)に示す如く、スリッタ18における全てのスリッタナイフ組24を使用して、段ボールシート12の4丁取りを行なっているものとする。またスコアラ14,16のロール組53も全てが使用されて、段ボール

シート12に所要のスコアリングが施されているものとする。

【0025】この状態で、オーダ変更により段ボールシート12を3丁取りする指令が発せられると、中央のスリッタナイフ組24におけるスリッタナイフ20,22は、シリンダ46,46の付勢により加工位置から非加工位置に退避する。また、その他のスリッタナイフ組24は、スリッタナイフ20,22を加工位置に保持したままの状態、対応のサーボモータ40が制御装置42により駆動制御されることにより、新たなオーダの切断位置までシート給送速度に比例した速度で移動される。すなわち、給送されている段ボールシート12は、図6(b)において二点鎖線で示すように斜めに切断されることとなる。そして、各スリッタナイフ組24が新オーダの切断位置に夫々到来すると、サーボモータ40が停止されてナイフ組24の位置決めが完了する(図6(c)参照)。

【0026】また、前記スコアラ14,16においても、不必要となるロール組53の野線ロール51,52を非加工位置に退避させると共に、その他のロール組53においては野線ロール51,52を加工位置に保持したままの状態、シート給送速度に比例した速度で新オーダのスコアリング位置に移動される。

【0027】従って、以後の段ボールシート12は、3組のスリッタナイフ組24により3丁取りされると共に、該シート12の所要位置にはロール組53によるスコアリングが施される。なお、旧オーダから新オーダへの切替え時に生ずる不良品の量は、スリッタナイフ組24をシート給送速度に比例した速度で移動するよう設定したことにより、2基のスリッタを直列に配置した場合と殆ど変わらない量とすることができる。また、スリッタナイフ組24が移動中における段ボールシート12の切断も良好で、かつ移動機構への負荷も許容範囲に抑えられる。

【0028】なお、新オーダでは不必要となる非稼働中のスリッタナイフ組24やロール組53は、次に必要となるオーダのための位置調整が予め行なわれる。この場合における各組24,53の位置調整速度は、シート給送速度に比例した速度であっても、予め設定した固定速度であってもよい。また、実施例のスリッタ・スコアラ装置10では、オーダ変更の際に各スリッタナイフ組24やロール組53は、段ボールシート12の幅方向中央を基準として、その両側に位置するスリッタナイフ組24やロール組53が相対的に近接・離間移動するよう制御される。従って、各組24,53の加工状態での移動に際し、段ボールシート12に加わる負荷は中央を基準として相互に打ち消し合うように作用し、該シート12の蛇行の発生を防止し得る利点がある。これにより、従来は必要であった蛇行防止装置を省略することができ、機構の簡略化を図ることが可能となる。

【0029】前記スリッタ・スコアラ装置10では、段ボールシート12の幅方向両端部に不要部分を生じないオーダがあり、このときにはスリッタ18における最外側のスリッタナイフ組24, 24を段ボールシート12の端部より外側に移動させて、トリム片12a, 12aのトリミングを行なわないようになっている。このような状態から、オーダ変更により所要幅のトリム片12a, 12aをトリミングする必要を生じた場合は、図7に示す如く、最外側のスリッタナイフ組24, 24を、スリッタナイフ20, 22を加工位置に保持したまま段ボールシート12の外側から内側に移動させる。なお、このときの移動速度は、前述した如くシート給送速度に比例する速度に設定されている。

【0030】前記スリッタナイフ組24, 24の移動により、段ボールシート12の端縁部は斜めに切断され、該ナイフ組24, 24が当該オーダの切断位置に到来した以後は、所要幅寸法のトリム片12aがトリミングされる。そしてトリミングされた各トリム片12aは、図3および図4に示す如く、スリッタ18の下流に位置する対応のトリムダクト50により段ボールシート12から吸引除去される。なお、トリム片12aの切断始端部は、細い状態から徐々に所要幅となるよう斜めに切断されるので、該始端部はトリムダクト50により確実に吸引され、吸引ミスを生ずることはない。すなわち、作業による吸引ミスの監視は必要なく、ラインの無人化を達成することが可能となるものである。

【0031】そして、所要のオーダ変更毎に最外側のスリッタナイフ組24, 24が移動してトリミングされるトリム片12a, 12aは、図7に示す如く、全てが繋がった状態となり、各トリム片12aは吸引ダクト50に連続的に吸引される。そして、再びトリム片12aの切断を必要としないオーダに変更される場合は、最外側のスリッタナイフ組24, 24は段ボールシート12の内側から外側に移動するため、トリム片12a, 12aは段ボールシート12から完全に切離される。従って、従来必要であったトリムシャー装置を不要とすることができる。

【0032】なお、実施例ではスリッタナイフ20, 22および野線ロール51, 52を加工位置と非加工位置とに昇降させる機構を備えたものにつき説明したが、該昇降機構は本願の必須の要件ではなく、該機構を省略することができるものである。また、スリッタ18では上下のスリッタナイフ20, 22により段ボールシート12を切断する構成としたが、例えば段ボールシート12を挟んで上側にスリッタナイフを配設すると共に下側に受け台を配設する1枚刃の構成を採用することもできる。更に、前記スリッタナイフ組24やロール組53の移動速度は、前述したシート給送速度に比例する速度に

限定されるものでなく、加工するシートの紙質、フルートの種類あるいは気象条件(湿度の高低等)等に応じて、シート給送速度と比例しない速度で移動させることも可能である。例えば、各条件毎に予め移動速度を設定しておき、オーダ変更に際してシート給送速度の高低に関係なく予め設定した速度でスリッタナイフ組24やロール組53を移動させる。また、加工精度を必要としない場合に移動速度を高速に設定し、加工精度を必要とする場合に移動速度を低速に設定してもよい。

#### 【0033】

【発明の効果】以上説明した如く、本発明に係るスリッタの運転方法によれば、1基のスリッタであっても、2基のスリッタを配置した場合と同程度の不良品の発生によりオーダ変更に対応することができる。すなわち、コルゲータラインの全長を短かくすることができ、設備コストを低減し得ると共に、工場内スペースの有効利用を図り得る。また、段ボールシートから生ずるトリム片を確実にシートから分離除去することができるから、作業による監視を必要とせず、ラインの無人化を達成することが可能となる。更に、段ボールシートにスコアリングを施すロール組も、加工状態のまま移動させるので、2基のスコアラを設けることなくオーダ変更に対応可能であり、ラインの全長を短かくし得ると共に、設備コストを低減することができる。

#### 【図面の簡単な説明】

【図1】実施例に係るスリッタ・スコアラ装置を示す概略側面図である。

【図2】実施例に係るスリッタ・スコアラ装置におけるスリッタを示す概略正面図である。

【図3】段ボールシートの不要部分をトリミングするスリッタナイフ組とトリムダクトを示す概略側面図である。

【図4】段ボールシートの不要部分をトリミングするスリッタナイフ組とトリムダクトを示す概略平面図である。

【図5】実施例に係るスリッタ・スコアラ装置の制御回路を示すブロック図である。

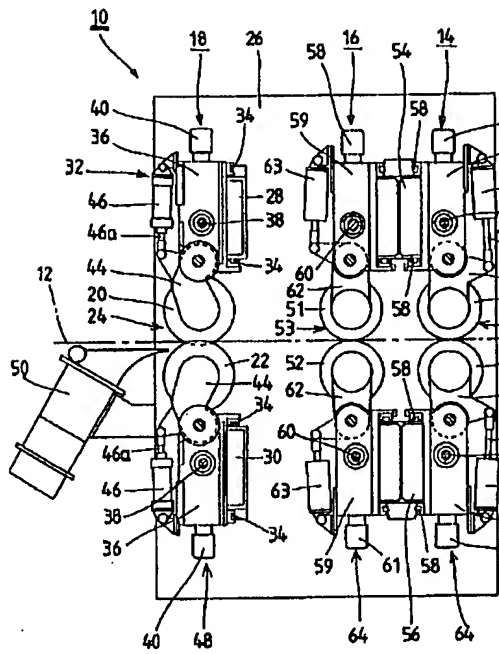
【図6】オーダ変更により段ボールシートの丁取り数を変更する場合のスリッタナイフ組およびロール組の動作説明図である。

【図7】段ボールシートから不要部分をトリミングする場合のスリッタナイフ組の動作説明図である。

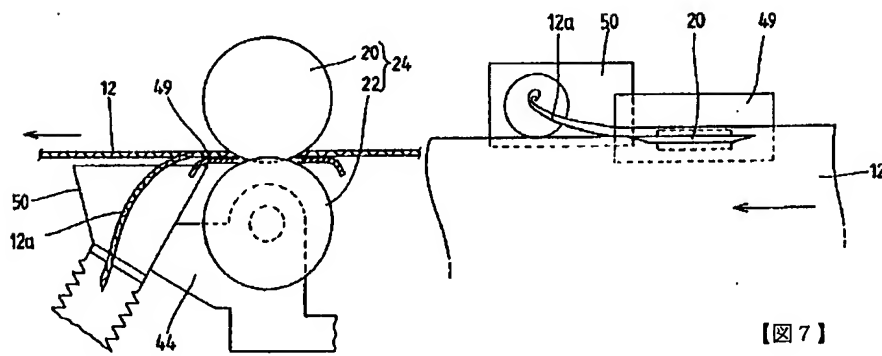
#### 【符号の説明】

- 12 段ボールシート
- 24 スリッタナイフ組
- 53 ロール組
- PL パスライン

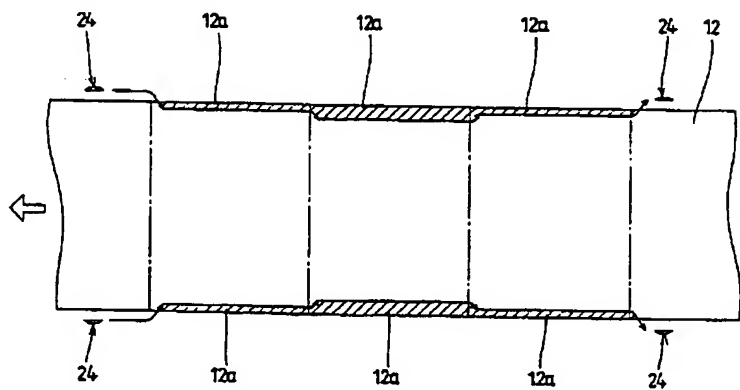
【図 1】



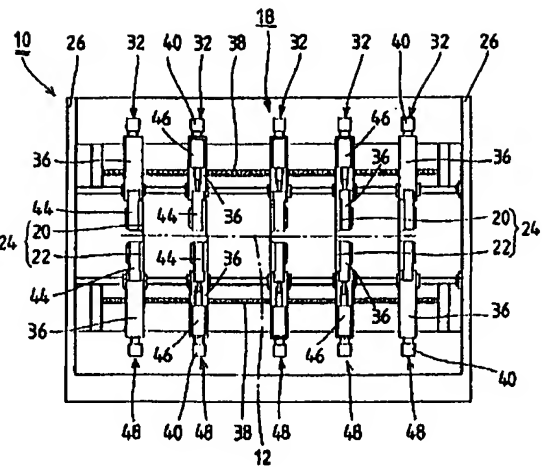
【図 3】



【図 7】

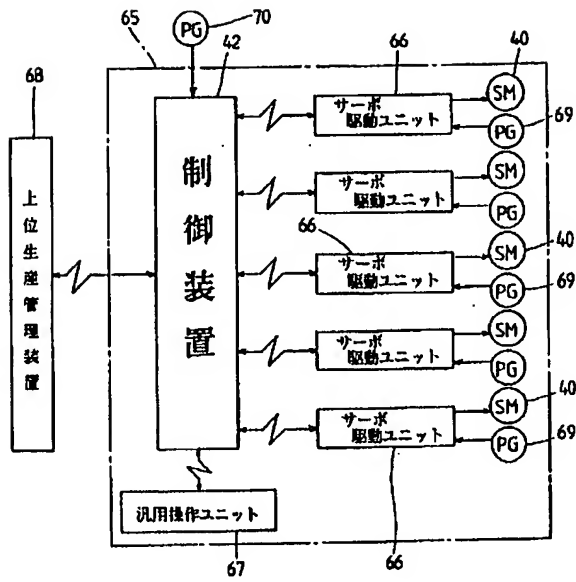


【図 2】



【図 4】

【図5】



【図6】

